

Gemrig (J. H.)
ILLUSTRATED CATALOGUE

OF

THE APPARATUS REQUIRED

FOR THE TREATMENT OF

DEFORMITIES, CONTRACTIONS, DEBILITIES,

AND

PARALYSIS OF THE HUMAN FRAME,

AND

DISEASES OF THE JOINTS.



MANUFACTURED AND SOLD

BY

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PHILADELPHIA.

P R E F A C E.

IN the compilation of the present edition of my ILLUSTRATED CATALOGUE, I have described each mechanical appliance as fully as I deemed it necessary to render its mode of action intelligible. In a few instances, in which the apparatus are not so well known, or so generally employed, as their merit entitles them to, I have briefly treated of the causes of the deformity, and the principles which should govern the application of instruments for their relief. The engravings represent the most approved forms of apparatus, and due credit is awarded to their inventors when their names could be satisfactorily ascertained. Full directions are given for taking proper measurements; but, whenever it is practicable, a plaster cast of the deformity should be sent, as greater accuracy of fit is thereby insured.

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I. APPARATUS FOR DEFORMITIES OF THE LOWER EXTREMITIES.

APPARATUS FOR CLUB-FOOT.

Fig. 1. DIRECTIONS FOR MEASUREMENTS.

- C. Circumference at the middle of the thigh.
- D. " around the calf.
- E. " above the ankle.
- F. " around the heel.
- G. " over the instep.
- H. " around the ball of the foot.
- F. I. Length of the foot.
- A. B. Length from centre of knee-joint to sole of foot.

Place the foot upon a sheet of paper, and draw a pencil line around it, so as to give its shape, as shown at K, for talipes varus.



Fig. 2 illustrates the most approved apparatus for correcting talipes varus, valgus, and equinus. Flexion and extension at the ankle-joint are regulated by a lateral screw; while the sole of the shoe is articulated beneath the mediotarsal-joint—the point at which the vertical and lateral displacements occur in valgus and varus—thereby providing for the necessary amount of abduction or adduction of the anterior two-thirds of the foot. The shoe itself is connected by a stirrup with the two lateral arms, which ascend the limb above the knee, and are secured by properly padded straps.



Fig. 3 shows a walking shoe, which is intended to be worn during the day only, after the foot has been brought into its normal position by the use of the foregoing apparatus. It requires no adjustment, and permits the natural movements of locomotion, while it confines the foot to the required position. The measurements are the same as those given above, with the exception of C. When, as not unfrequently happens, the muscular power of the knee has been impaired, causing the joint to be bent backward and inward, the fact should be mentioned, in order that the apparatus may extend to the middle of the thigh, and be constructed so as to remedy the defect.



Fig. 4.



Fig. 4 illustrates another form of walking shoe, which, from the addition of an elastic band, or piece of rubber tubing, is preferable when the contraction of the tendo-Achillis has not been overcome, or there is marked paralysis of the extensor muscles of the foot and toes.

Fig. 5.

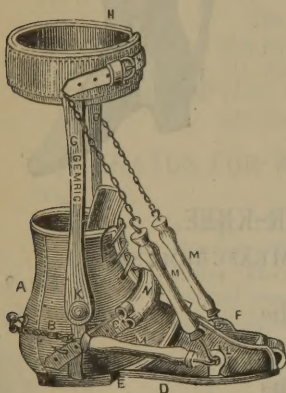


Fig. 5. Dr. Sayre's improved ball and socket shoe. The peculiarities of this apparatus consist, first, in the presence of an orbicular joint in the sole of the foot, instead of a freely mobile hinge joint, which only admits of lateral movements, as in fig. 2; and, secondly, in the adaptation of rubber tubing, through which not only is a constant, steady, and equable tractile force maintained, when the muscular rigidity is too great to yield to manipulation, unless it be continued for a longer time than can generally be given, but the action of the paralyzed muscles is also imitated,

permitting and promoting the constant movements of the muscles, and the joints acted upon by them. The precise amount of force required to overcome the distorting muscles can be regulated at will by means of the chains attached to the tubing; the change of the hook from one link to another increasing or decreasing the power according as the length of the chain and tubing is diminished or increased. In the cut the shoe is depicted arranged for varus or valgus, and it will be seen that the elastic tubes insure flexion at the ankle, as well as rotation with adduction or abduction, in accordance with the position of the foot-piece of tubing on the inner or outer side of the shoe, at the medio-tarsal-joint.

Fig. 6.

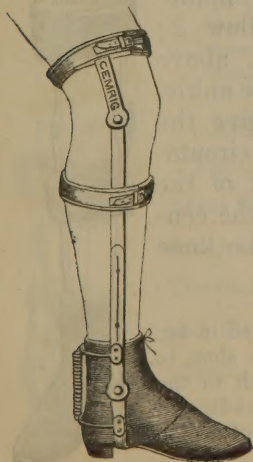
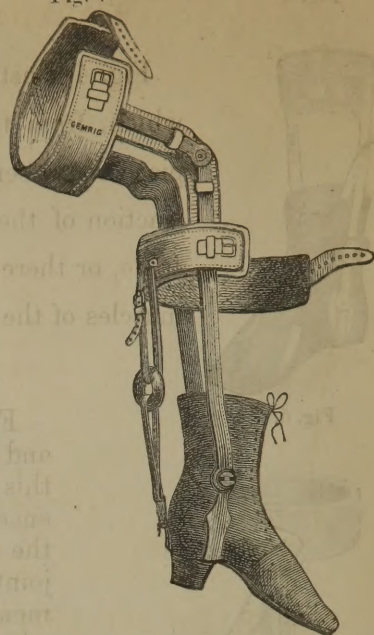


Fig. 6 illustrates the ordinary instrument used for calcaneal club-foot. It consists, in its essential features, of a spiral spring, which is attached to two steel bands stretching from one lateral bar of the leg portion to the other, above and below the centre of the ankle-joint, through the action of which the elongation of the tendo-Achillis is overcome, and the calf muscles kept in constant motion during progression. The sole of the shoe is provided with a steel plate sufficiently strong to maintain the normal position of the plantar arch. Measurements as in fig. 1.

Fig. 7

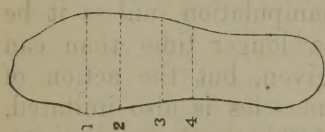
Fig. 7 shows Volkmann's apparatus to fulfill the same indications. A ring of india-rubber inserted between two straps, the one attached to the leg-band, the other attached to a hook projecting from the heel of the shoe, taking the place of the spiral spring. The requisite amount of contractile force is regulated by shortening or lengthening the straps. Instead of this arrangement a strong elastic cord or webbing may be attached at the same points; the power being regulated by a buckle. These instruments will be found useful in favoring motion after excision of the ankle-joint.



APPARATUS FOR KNOCK-KNEE.

Figs. 8, 9. DIRECTIONS FOR MEASUREMENT.

Fig. 8.



In sending the measure of a normal foot for this or any other af-

fliction, to insure a good fit, place the foot upon a sheet of paper, and draw a pencil

line around it, to give it the shape, as in fig. 8. Take the circumference around the base of the toes, 1; immediately behind this joint where the foot is hollow, 2; around the instep, as at 3; over the instep, above the joint, 4; around the heel, 5; and around the ankle, 6, fig. 9. Draw an outline of the knee, and give the circumference of the upper third of the thigh, circumference above and below the knee, diameter of the knee, length from upper third of the thigh to the centre of the knee, and length from the centre of the knee to the sole of the foot.

Fig. 9.

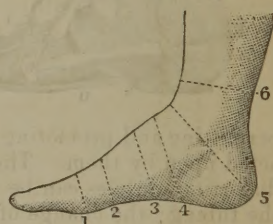


Fig. 10.



The instrument for the relief of knock-knee, represented in fig. 10, is very simple and efficient. It consists of a plain shoe, to which are attached two lateral steel stems, which reach to the upper third of the thigh, connected by thigh and calf-bands, and provided with joints at the ankle and knee, the latter of which is confined in its normal position by a well padded cap.

APPARATUS FOR BOW-LEG.

Fig. 11.

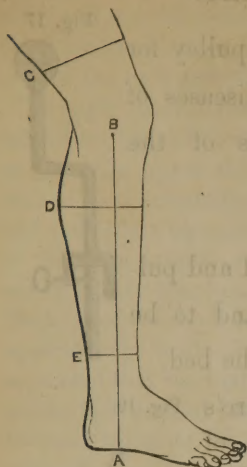


Fig. 11. DIRECTIONS FOR MEASUREMENT.

Circumference of upper third of thigh.

C. Circumference above the knee.

D. " below the knee.

E. " above the ankle.

Diameter of knee.

A. B. Length from centre of knee-joint to sole of foot, and from the knee-joint to the upper third of the thigh, to be taken on the inner side of the limb; place the leg on a sheet of paper and draw its outline from above the knee to the sole of the foot.

The instrument, fig. 12, is constructed on the same principles as that depicted in fig. 10, with the addition of a well padded steel plate attached to the external lateral stem, which rests on the highest point of the arc.

Fig. 12.



APPARATUS FOR ANTERIOR CURVATURE OF THE LEG.

Fig. 13.

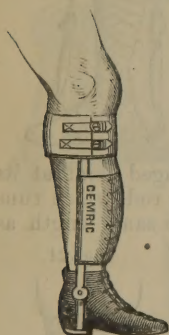


Fig. 13 illustrates Bigg's appliance for the correction of anterior curvature of the tibia. It consists of two lateral steel stems, jointed opposite the ankle, and terminating above in a well padded metal band. By lacing a leather band, which passes across the front of the arc of the curvature, and is then reflected back again around the lateral stem, the heel of the shoe and the calf-band are made the points of resistance. The more tightly the band is laced, the greater will be the depression of the transverse axis of the arc of the curvature, with a corresponding expansion at extremities. The measurements required are those for the foot, figs. 8 and 9, and the circumference of the calf, C, fig. 14, and the length from the calf to the sole of the foot, A B.

Fig. 14

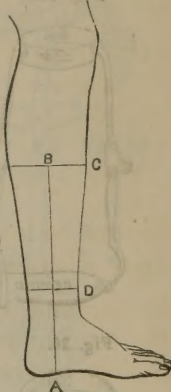
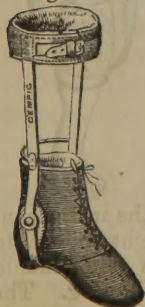


Fig. 15.



APPARATUS FOR WEAK ANKLES.

Fig. 15 shows a splint for the support of weak ankles, arising either from partial paralysis of the muscles which move the foot and toes, with a tendency to varus or valgus, or from sprains. The measurements required are the same as those given above, and the side towards which the foot inclines should be mentioned.

II. APPARATUS FOR DISEASES OF THE JOINTS OF THE LOWER EXTREMITIES.

Fig. 16.

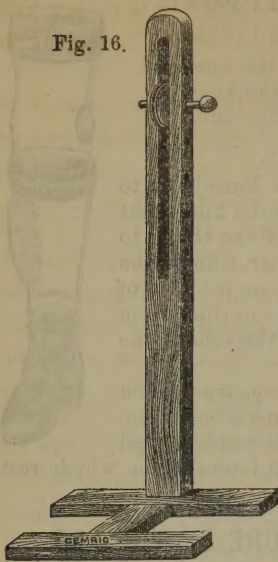


Fig. 16. Stand and pulley for making extension in diseases of the joints, or fractures of the lower extremity.

Fig. 17.



Fig. 17. Levis' stand and pulley, made of metal, and to be attached to the foot of the bed.

Figs. 18 and 19. Sayre's apparatus for extension of inflamed ankle-joint, before and after application.

Fig. 18.

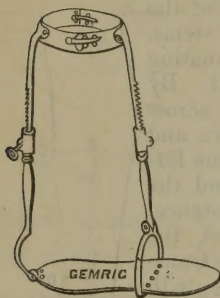
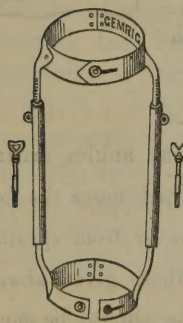
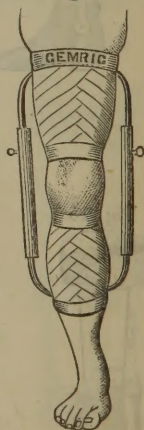


Fig. 20.



This instrument consists of a firm steel plate, shaped to the sole of the foot, with a hinged joint at the heel, attached to a rod slightly curved at the bottom, and extending up the back of the leg to a point near the knee. Over the instep is an arch like the top of a stirrup, with a hinged joint at its summit, from which springs another rod, which runs up the front of the leg, and is of the same length as the other. These rods are made with a male and female screw, or with a ratchet and cog, for extension, and connected at the top by a band of sheet iron, on one side

Fig. 21.



of which is a hinge, and on the other a lock like that on a dog collar. The instrument is applied with Canton flannel adhesive plaster cut in strips about one inch in width, long enough to reach from the ankle to a point near the tuberosity of the tibia, and placed all around the limb perpendicularly. The plaster is secured in its position to within an inch of its upper extremity, by a well adjusted roller bandage. The instrument is then applied, and the foot firmly secured by a number of strips of adhesive plaster to prevent its slipping, and the ends of the plaster at the top of the instrument turned over the collar, which has been previously locked just tight enough to be comfortable, and secured by a turn or two of the bandage. A roller should be carefully applied over the foot to prevent the plaster from slipping. The measurements required are, the length of the sole of the foot; height from the sole to two inches below the knee; circumference of calf; and circumference of instep.

Figs. 20 and 21 illustrate Dr. Sayre's apparatus for extension of inflamed

knee-joint, before and after application. It consists of two steel collars about an inch wide, of which one embraces the upper third of the thigh, the other the leg above the ankle. They admit of adjustment by means of a hinge and slide, and may be locked at any given point, by turning the nut with the key fitted for this purpose. The collars are connected on each side by extension rods of the rack and pinion or screw construction.

To apply this instrument, adhesive strips, an inch wide, and long enough to extend from just below the knee to near the ankle, and from the knee upwards as far as the upper third of the thigh, are applied, and secured to within an inch of their extremities by rollers. The apparatus is then placed on the limb, and the collars fastened sufficiently tight to be comfortable, and the free ends of the strips turned over and secured by a roller. After the plaster has set, say in twenty-four hours, the connecting rods are extended simultaneously by the keys of the rack and pinion movement, or by turning the screws, if the apparatus be made in the latter way, until the tibia and femur are so far separated that the limb is brought nearly straight, and pressure can be made on the foot without being productive of pain. A roller is next carried over the foot and leg up to the instrument, to prevent oedema. The joint is thus left exposed (fig. 21) for such applications as the surgeon may deem desirable.

Fig. 22.

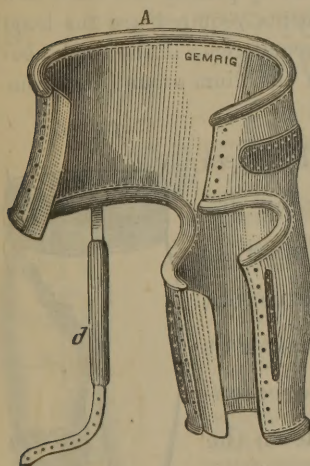


Fig. 22 illustrates Bouvier's apparatus for fixation of the hip-joint. It is constructed of leather and steel, and is applied by means of lacings. The same form of contrivance can be moulded out of gutta-percha, or be made of iron wire moulded to the pelvis and thigh, and covered with wire gauze. It is useful

when it is deemed desirable to secure immobility of the joint, along with exercise in the open air. If a cast cannot be obtained, the following measurements are requisite: Circumference of pelvis at iliac crests; circumference at the nates; circumference of upper part of thigh and of thigh above the knee; distance from crest of the ilium to the outer condyle. State side on which the disease is seated.

Fig. 23.

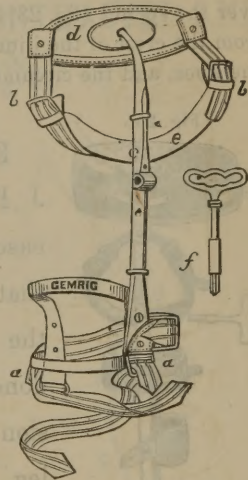


Fig. 23. Sayre's apparatus for extension in hip-joint disease, consists of two pieces of corrugated steel, the lower of which is made to slide within the upper by means of a key, *f*, thereby forming a splint which extends from the crest of the ilium to two inches above the condyles of the femur. To the upper end of the splint is attached, by means of a ball-and-socket-joint, a padded concave steel plate, *d*, which rests upon the pelvis just below the crest of the ilium, and

to each extremity of which the perineal band, e, made of buckskin, stiffened with hair, and terminating in elastic webbing, bb, is secured by buckles. At the lower end of the splint are a roller and buckle for the reception of a webbing, aa, stitched to the retaining adhesive plaster, while two semicircular steel bands pass from this portion across the front of the thigh to another straight piece which rests on the inner side of the limb, parallel with the outer bar, and also terminates in a roller and buckle. A strap which extends posteriorly from the inner to the outer rod, is intended to secure this portion of the apparatus when it is adjusted.

To apply the splint, two fan-shaped pieces of inelastic adhesive plaster (fig. 24) are required; one large enough to reach from the perineum to within two inches of the inner condyle, the other from the great trochanter to a point directly opposite the end of the inner plaster. Sew on the narrow end of each (fig. 24, a) one of the webbings represented in fig. 23, aa. Apply them to their respective places, and secure them by a roller. The instrument, shortened, is now laid over the thigh, the webbing (fig. 24, a) firmly fastened over the rollers to the buckles (fig. 23, aa), and the remaining one around the thigh. The perineal band is now adjusted, and the instrument extended with the key, just enough to make the patient comfortable, and then locked by pulling the slide down over the spring (fig. 23, c). The only measurements required are the length from the crest of the ilium to the patella; the circumference of the thigh above the knee, and the circumference from the crest of the ilium around the groin

Fig. 24.

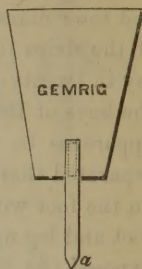


Fig. 25.



Fig. 25 illustrates Professor J. Pancoast's splint for hip disease. Its action is similar to that of the above apparatus, but the use of adhesive plaster is done away with by the extension of the instrument down the leg, and the addition of a shoe.

Fig. 26.

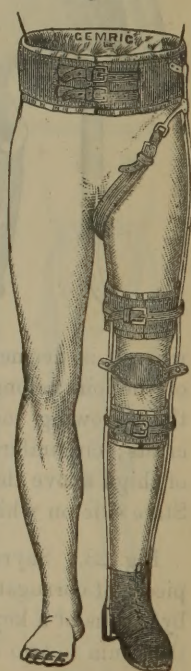
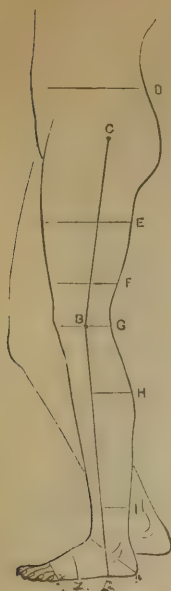


Fig. 26 shows the mode of its application.

Fig. 27.



MEASUREMENTS REQUIRED.

- Fig. 27.—A. B. Length from patella to sole of foot.
 B. C. Length from patella to centre of hip-joint.
 D. Circumference below crest of ilium.
 E. “ of thigh.
 F. “ above knee.
 G. “ of knee.
 H. “ around calf.
 I. “ above ankle.

Place the foot on a piece of paper, and draw outline, and give the measurements indicated in figures. State which limb is affected.

III. APPARATUS TO OVERCOME CONTRACTED AND ANCHYLOSED JOINTS.

Fig. 28.

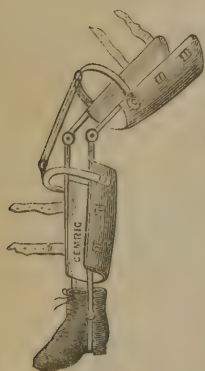


Fig. 29.

Fig. 28 illustrates a simple apparatus to overcome false ankylosis by means of elastic extension. It consists of lateral stems, freely-jointed, from which spring two arcs for the attachment of a strong band of india-rubber, and provided with leather troughs for the thigh and calf. Counter resistance to the extending force is provided for by a knee-cap. The continuous and equable traction of the elastic band will gradually and surely overcome the contraction of the muscles and the adapted shortening of the other soft parts, particularly if the patient, during progression, occasionally bears the weight of his body on the affected limb.

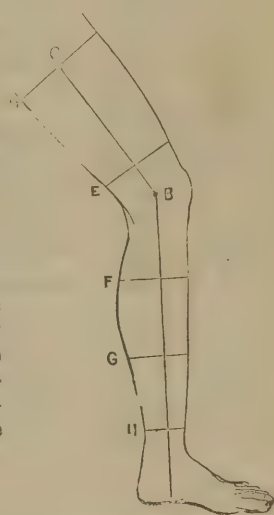


Fig. 29.—MEASUREMENTS REQUIRED.

- A. B. Length from sole of foot to centre of knee-joint.
 B. C. Length from centre of knee-joint to the junction of the upper with middle third of thigh.
 D. Circumference of thigh at the above point.
 E. “ above knee.
 F. “ below knee.
 G. “ of calf.
 H. “ above ankle.

The measure for the shoe to be taken as directed in figures.

Fig. 30.

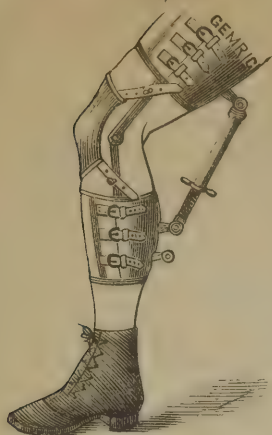
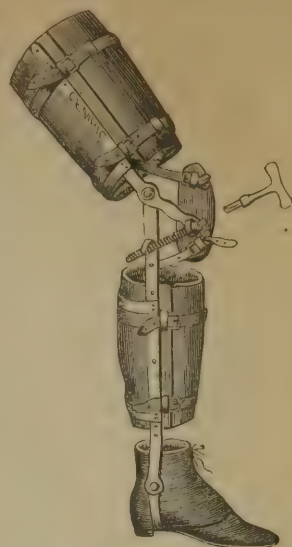


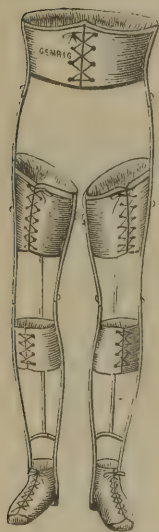
Fig. 30 shows the modified apparatus of Stromeier, and fig. 31 illustrates another instrument, in both of which the extending force is applied by means of screw power. The latter instrument is preferable, as the power acts in a better direction, and is not in the way of clothing. Measurements required are the same as in fig. 29.

Fig. 31.



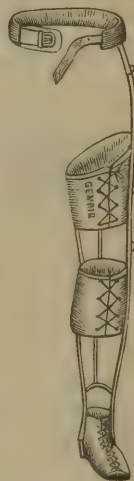
IV. APPARATUS FOR THE RELIEF OF PARALYSIS OF THE LOWER EXTREMITIES.

Fig. 32.



Figs. 32 and 33 illustrate instruments to overcome paralysis of both or of one of the lower limbs, and are to be employed only when control over the hip-joint has been lost. They consist of steel stems, carried, on the inner side, as high as the perineum, and on the outer side to the pelvic band, or to the axilla, and provided with joints opposite the hip, knee, and ankle, and secured by pelvis, thigh, and leg bands. If the patient is not sufficiently strong to maintain the erect posture, spring locks are added at the knee and hip, which

Fig. 33.



may be freed when the patient lies or sits down.

The measurements required are, in addition to those of the foot, the length from the sole to the centre of the knee; the length from the latter point to the hip; length from hip to axilla, if requisite; circumference above the ankle, below and above the knee, around the middle of the thigh, one inch below the crest of the ilium, around the waist, and, if required, around the chest.

Fig. 34

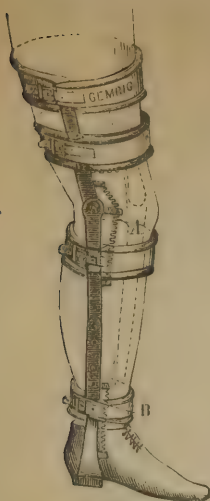


Fig. 34, Mathieu's apparatus for paralysis of the quadriceps extensor cruris, A, and extensors of the foot, B, by means of spiral springs. The deficiency of muscular power may, however, be replaced by cords of india-rubber. The measurements required are those given in figs. 1, 8, and 9.

Whenever the object of the practitioner is to imitate the action of a single muscle or of a group of muscles by employing elastic substitutes, whereby the sound muscles are antagonized, and muscular development and progression are encouraged, he should indicate what muscles are paralyzed, and send the

proper measurements, so that we may construct a suitable apparatus. The annexed illustration (fig. 35) will convey a good idea of an apparatus employed by Bigg for paralysis of both extremities. The lateral steins have joints opposite to those of the hip, knee, and ankle, to which are affixed strong vulcanized cords, giving strength to the instrument, and at the same time admitting of articular motion.

Fig. 35.

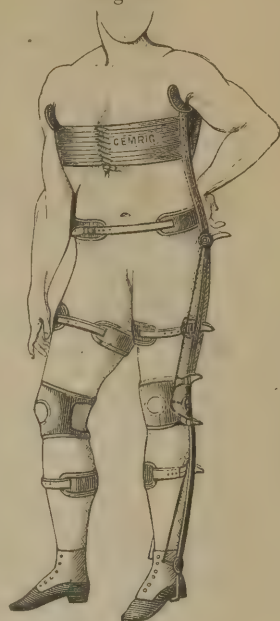


Fig. 36.



Fig. 36 shows Darrach's wheel-crutch, or go-cart, which will be found to be an invaluable aid to the treatment of paralysis of the lower extremities, as it enables the patient to move about, and gradually discipline the weakened muscles until they acquire strength. Being placed within the apparatus, every effort on the part of the patient to move each leg forward in turn, is sufficient to propel the go-cart onwards, thereby facilitating the exercise of the limbs. It is made of a strong light frame of wrought iron tubes and steel rods, open at one end and provided with wheels, so arranged that the instrument will advance or turn in any

direction, by the slightest inclination of the body, which is supported by elastic cushioned arm-rests and elastic attachments to the frame. It is very easily guided, and cannot swing sideways or turn over.

The only measurements required are the width of the body from one axilla to the other, in a straight line—not following the curvature of the breast—the distance from the axilla to the floor, and circumference of the waist over the underclothing.

V. APPARATUS FOR UNUNITED FRACTURES AND RESECTIONS.

Fig. 37.

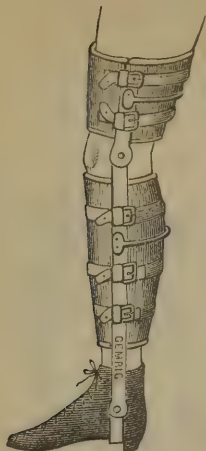
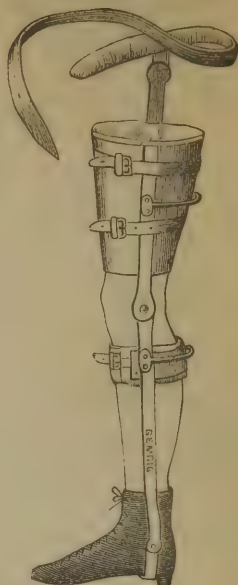


Fig. 37 illustrates the apparatus of Dr. H. H. Smith, for ununited fracture of the bones of the leg.

Fig. 38 shows the same apparatus for the treatment of ununited fracture of the femur. Both instruments are equally applicable in cases of resection.

Fig. 38.



The measurements required for fig. 37, are those for the foot, the circumference above the ankle, around the calf, below and above the knee, and the middle of the thigh, and the length from the sole to the centre of the knee, and from the latter point to the thigh circumference.

For fig. 38, in addition to the foregoing, give the circumference of the upper third of the thigh, and the length from the centre of the knee to the hip, and the circumference of pelvis one inch below ilium crest, and around the waist. State which limb is affected, and the seat of the fracture or excision.

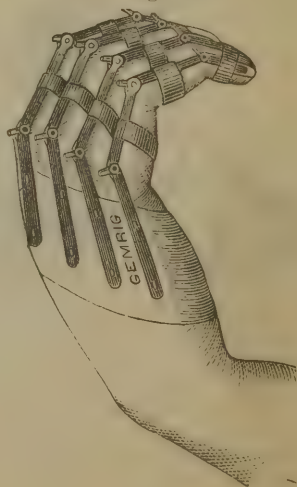
VI. APPARATUS FOR DEFORMITIES OF THE UPPER EXTREMITY.

APPARATUS TO OVERCOME CONTRACTION OF THE FINGERS.

Fig. 39.

Fig. 39 shows Bigg's instrument to relieve excessive contraction of the fingers. A padded plate rests upon the back of the hand, to which five jointed rods are attached, four of which follow the course of the fingers and the other the thumb. A ratchet joint, governed by a key, corresponds exactly with each phalangeal articulation, and the fingers are bound to the rods by narrow tape. On moving either of the artificial joints extension of the articulation on which it is placed results

The measurements required are the circumference of the hand, and the distance between the phalangeal joints.



APPARATUS FOR CONTRACTED WRIST.

Fig. 40.

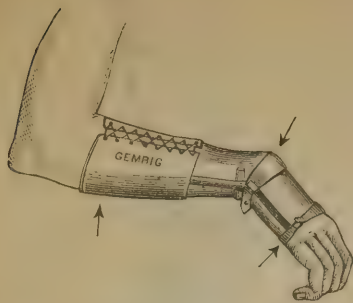


Fig. 40 illustrates Bigg's splint to overcome flexion and contraction of the wrist. It consists of two lateral stems, attached to a metal trough, provided with a ratchet joint at the wrist. A softly padded plate rests against the palmar surface of the hand, and across the metacarpal extremities. When applied, the forearm rests in the trough of the instrument, whilst the hand-plate rests against the base of the fingers, and a strong, but well-padded

leather band passes over the upper and convex surface of the wrist. The lateral stems being flexed by means of their ratchet joint, resistance of the limb against the instrument occurs at the hand-plate, the wrist-band, and the trough.

The measurements required are the length from the metacarpo-phalangeal articulations to the centre of the wrist, from the latter point to three inches below the elbow, and the circumference at the latter point and two inches above the wrist, and around the hand. For this, as well as for other instruments to be used about the wrist, the arm and hand should be placed upon a sheet of paper, and their contour traced by means of a pencil.

Fig. 41.

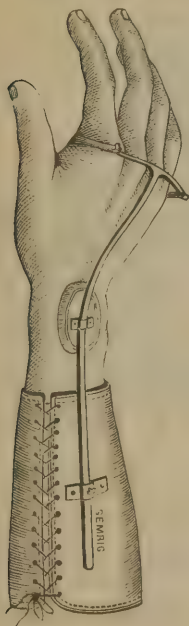


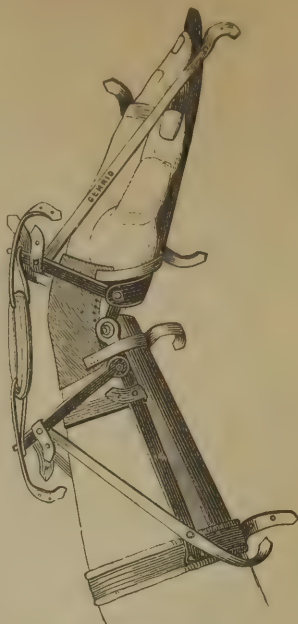
Fig. 41 shows an instrument devised by Dr. S. W. Gross, to overcome, by elastic extension, contraction and false ankylosis of the wrist. It consists of a T shaped metal stem fitted to a leather trough, the extremities of the T being turned up as hooks to carry a strong band of india-rubber. A movable pad furnishes over the wrist an adequate point of resistance

The only measurements required are the circumference of the arm at its middle, and above the wrist, and the width across the heads of the metacarpal bones.

Fig. 42.

Blanc's apparatus for elastic extension of contracted wrist, is admirably adapted to overcome ankylosis of the wrist, acting, as it does, slowly and continuously, through the aid of a ring of india-rubber.

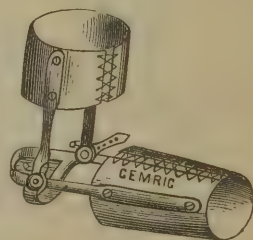
The measurements required are the length from the tips of the fingers to the centre of the wrist, and from the latter point to the middle of the forearm; the circumference of the middle of the forearm and above the wrist, and the width of the hand.



APPARATUS FOR CONTRACTED OR ANCHYLOSED ELBOWS.

Fig. 43.

Fig. 43 illustrates an apparatus for false ankylosis of the elbow, the lateral stems of which are moved by endless screws instead of the old arrangement of Stromeyer, which is very faulty, as the mechanical centre of the splint constructed on that principle does not coincide with the centre of the elbow-joint, but is placed above it. The splint as made by us is far more satisfactory, and as its construction may be taken in at a glance, it needs no further description. A leather cap receives the elbow, and constitutes a point of counter-resistance when extension is begun.



The measurements required are the length from the wrist to the elbow, and from the elbow to the axilla, and the circumference of the wrist, forearm, elbow, and arm.

VII. APPARATUS FOR PARALYSIS OF THE UPPER EXTREMITIES.

Fig. 44.

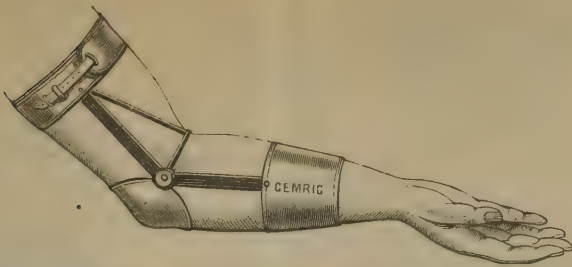


Fig. 44 illustrates Bigg's apparatus for paralysis of the elbow. The action of the flexor muscles is imitated by two india-rubber bands which extend between two upright levers, which spring from the lower lateral stems. The stems are attached to a cap for the elbow, where they are jointed together. The measurements required are the same as those given in fig. 43.

VIII. APPARATUS FOR DEFORMITIES OF THE NECK AND TRUNK.

BANDAGES FOR ROUND SHOULDERS AND SPINAL DEBILITY.

Fig. 45.



Fig. 46.



Fig. 45 illustrates one of the more common forms of elastic shoulder braces, so arranged as to button to the pantaloons; and fig. 46 shows an arrangement designed for females, which may be made so as to combine a corset and brace. These instruments are useful not only in correcting a habit of stooping contracted by children at school, or through laziness, but they may be employed in cases of enfeebled muscles, through which the spinal column is weakened, and tends to deviate in different directions. In ordering a brace, the age, sex, and weight of the patient should be given.

Fig. 47.

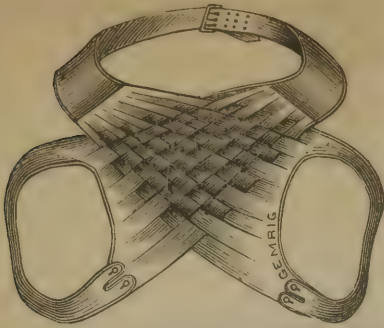
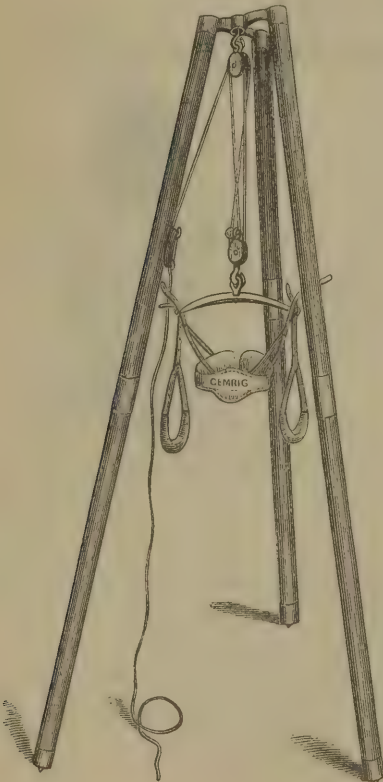


Fig. 47 represents Bouvier's brace for the correction of round shoulders, flat breast, and light grades of scoliosis. It is made of satinnet, the interlacing portions being reinforced by whalebone.

Sayre's Suspension Apparatus for applying the Plaster Jacket.

This consists of a curved iron cross-beam, to which is attached an adjustable head- and chin-collar, with straps fitted to axillary bands. To a hook in the centre is fixed a compound pulley, the

Fig. 49.



other end of which is secured either to a hook in the ceiling or to the top of an iron tripod about ten feet in height.

In fig. 48 this apparatus is shown as applied.

Fig. 48.



Fig. 49 will still further show how the suspension is made from the tripod. The cord is fastened at the desired point by "belaying" it around a fixture at one side.

Fig. 50 shows a very convenient apparatus for preparing the plaster bandage.

The material used for this purpose must be loosely woven, such as Swiss muslin, mosquito-netting, or crinoline. It is first rolled over the rod at the upper part of the frame, and then the loose end is carried down through a very narrow slit in the bottom of the trough below. Into this the finely-ground dry plaster is sifted, while the bandage is slowly wound downwards, on the lower bar, which is turned by a crank; the arrangement being here just like that of an ordinary bandage roller.

The rollers thus prepared may be kept ready for use in an air-tight tin vessel. When required, they are set on end in a

Fig. 51.



basin containing water enough to cover them entirely. A free escape of bubbles of gas through the water will be observed for a short time; when this has ceased the bandages are ready for use.

The surface of the skin should be protected by an elastic, but closely-fitting shirt or vest, without armlets, but with tabs to tie over the shoulders and composed of some soft, warm, or knitted material.

Whenever the patient is a developing girl, pads should be placed over each breast, to be removed just before the plaster has completely set. Another pad, called by Dr. Sayre the "dinner pad," composed of cotton loosely folded up in a handkerchief, is similarly used over the abdomen; it should be very thin at its lower part, so as not to make the jacket too loose. On the same principle, small pads are applied at either side of tender spots over prominent bony processes, and two folded cloths, three or four thicknesses each, just over the anterior iliac spines.

The shirt being accurately applied, and kept smoothly stretched by means of the shoulder tabs above and two tapes below (one in front and the other behind, tied over a handkerchief placed in the perineum), the patient is to be gently drawn up *until he feels comfortable*.

A prepared and saturated roller, gently squeezed so as to get rid of all surplus water, is now applied around the smallest part of the body, and carried round and round the trunk downwards to a little beyond the crest of the ilium, then spirally from below upwards until the entire trunk is encased from the pelvis to the axillæ. The bandage should be laid smoothly, and not drawn tight.

After one or two thicknesses of bandage have been thus applied, several narrow strips of roughened tin are laid on either side of the spine, so as to surround the body, with intervals between them of two or three inches. Over these another plaster bandage is applied. Very soon the plaster sets so firmly that the patient can be removed and laid upon his face or back upon a hair mattress or air-bed. The dinner pad, &c., are then removed, and the plaster gently pressed in with the hand in front of each iliac spine, so as to widen the case over the bony projections. While the patient is thus lying, it is sometimes necessary to wet the jacket with a little water, and then to dust on some more plaster.

As soon as the jacket has hardened, the patient may be allowed to walk about.

To remove the jacket (generally after two or three months), divide it with cutting-pliers, a knife, or a very narrow saw, from the pubes to the sternum. It may then be gently stretched apart.

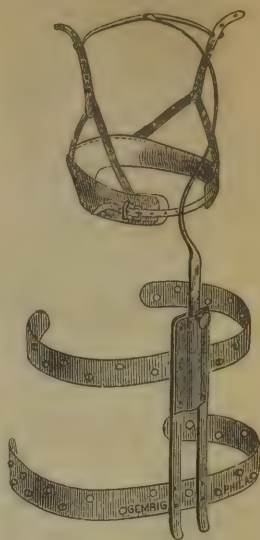
DR. SAYRE'S JURY-MAST

For suspending the head in cases where the cervical, or upper dorsal vertebræ, or both, are involved.

It consists of two pieces of malleable iron bent to fit the curve of the back. To the lower portion are attached two or more roughened tin strips long enough to go nearly around the body. From between two cross-pieces at the upper extremity of the iron pieces springs a central shaft, carried in a curve over the top of the head, and capable of being elongated at will. To this is attached at its upper extremity a swivel cross-bar with hooks, from which depend straps supporting a head- and chin-collar.

To apply it: the patient having been encased, in the usual manner, in a few thicknesses of plaster roller, the jury-mast apparatus is put on over this, care being taken that the malleable iron strips are bent so as to conform to the surface of the plaster, and that the shaft over the head be kept in the same line with the spinous processes. The perforated tins are carried round the body, their ends, however, not being allowed to meet. The apparatus having been thus carefully adjusted, fresh layers of plaster bandage are now applied, in order to hold the instrument firmly in its place.

Fig. 52.

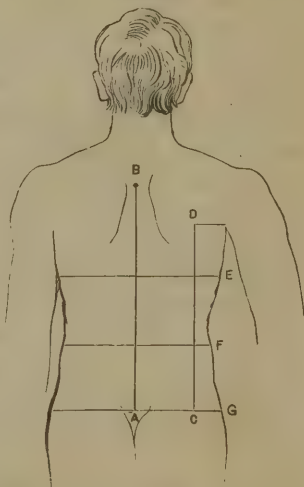


APPARATUS FOR CURVATURE OF THE SPINE.

Fig. 53.

Fig. 53.—MEASUREMENTS REQUIRED.

- G. Circumference one inch below the iliac crest.
- F. " around the waist.
- E. " under the arms.
- C. D. Length from axilla to lower circumference.
- A. B. Length from the lower circumference to a horizontal line with the shoulders.



In addition to the above measurements, state the distance from the lower circumference to the point at which the curves blend, the nature of the curvature, whether primary dorsal or primary lumbar, whether right or left, and the age and sex of the patient.

Fig. 54.



Fig. 54 shows a supporter for cases where there is a tendency to curvature of the spine. The lower or abdominal portion is elastic, the thoracic portion laces up. The crutch-heads in the axilla serve to support the shoulders, and keep their weight from the affected portion of the spine.

Fig. 55.

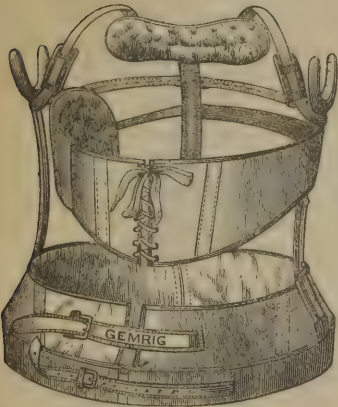


Fig. 55 represents a somewhat similar apparatus, with the addition of a pad to correct the lateral curvature.

Of course the precise position of this pad may be varied to suit any special case.

Fig. 56.

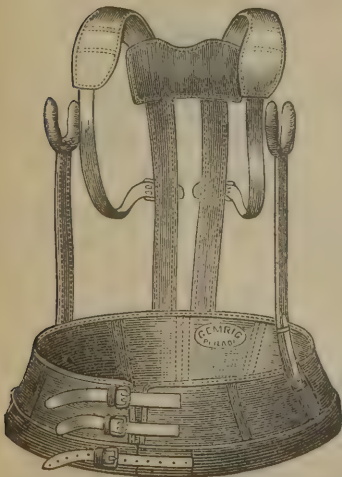


Fig. 56 shows a supporter for posterior curvature of the spine. The apparatus consists of a pelvic band supported by two lateral crutches reaching up as far as the axillæ. It has also posteriorly an upright extending on either side of the spine, with axillary strap.

Fig. 57 represents Bigg's instrument, which will be found very serviceable in recent cases, acting as it does by relieving the spine of the weight of the upper extremities by means of lateral crutches, while it makes lateral compression over the curves, through which the spine becomes gradually restored with only a slight expenditure of force. Its action will be best understood by the following description. "The vertical lever has two axes, one coincident with the point of junction of the upper and lower spinal curves, the other with the sacro-lumbar articulation. A padded metal lumbar plate is fixed to the former centre, and another, which rests upon the enlarged ribs belonging to the dorsal curve, is arranged on the opposite side. On moving the sacro-lumbar centre, the plate on the left side produces diminution of the lower curve, and on bringing into action the ratchet which corresponds with the junction of the lumbar and dorsal curves, a lessening of the dorsal arc ensues."

Fig. 57.

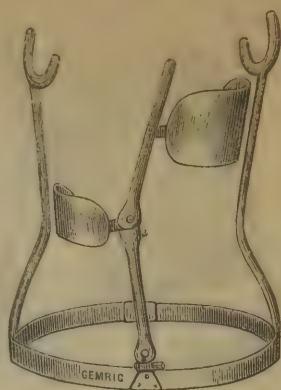


Fig. 58 shows the instrument of Dr. H. G. Davis, which also acts through elastic traction. The straps are attached to an upright in front, similar to the one in the figure, curved to correspond with the form of the trunk.

Fig. 58.

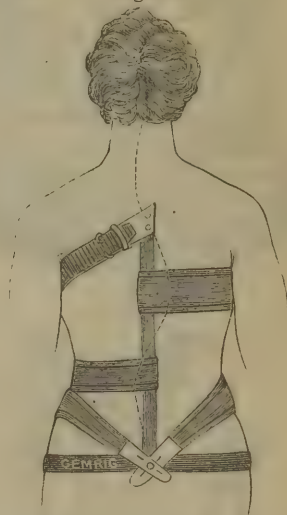


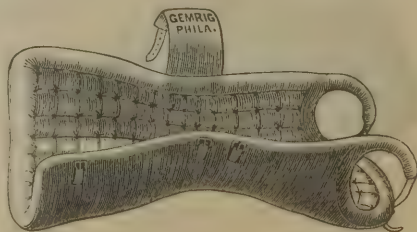
Fig. 59:



Fig. 59 illustrates a method of making extension, by weight and pulley, in acute Pott's disease of the cervical vertebræ, when it is deemed expedient to treat the patient in the horizontal posture. The band passing under the chin and occiput is made of gutta-percha or sole leather accurately moulded to the parts and well padded, to which metal rings are attached for holding an iron arch to which the extension weight is secured.

Fig. 60 represents Bennett's cuirass, which admits of the patient being exercised in the recumbent posture in the open air. It consists of a frame-work of soft iron, with a piece along the spine; the intermediate space being filled with wire gauze. The frame is well padded and covered, and applied by means

Fig. 60.



of the shoulder straps and belt. Two handles may be fixed to the sides of the instrument, by means of which the patient can be carried about. A cast of the back is required, in order that a proper fit may be secured. This device answers an admirable purpose for treating caries of the spine in the recumbent posture.

Fig. 61.

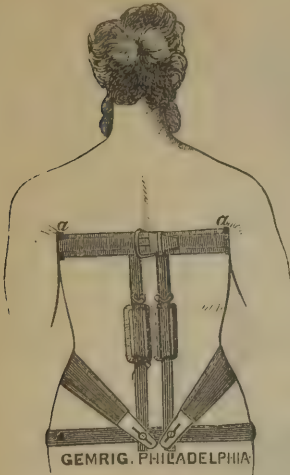


Fig. 62.



Figs. 61 and 62 show respectively the instruments of Dr. Davis and Dr. Taylor, which are so well known in this country as not to need description. The measurements required are the circumference of pelvis one inch below the crests of the ilium, and of chest under the axilla; transverse diameter of

the protuberance; distance from sacro-lumbar articulation to the first and last vertebra involved; distance from the same point to the vertebra prominens, or seventh cervical; and distance from crest of ilium to axilla.

APPARATUS FOR WRY NECK.

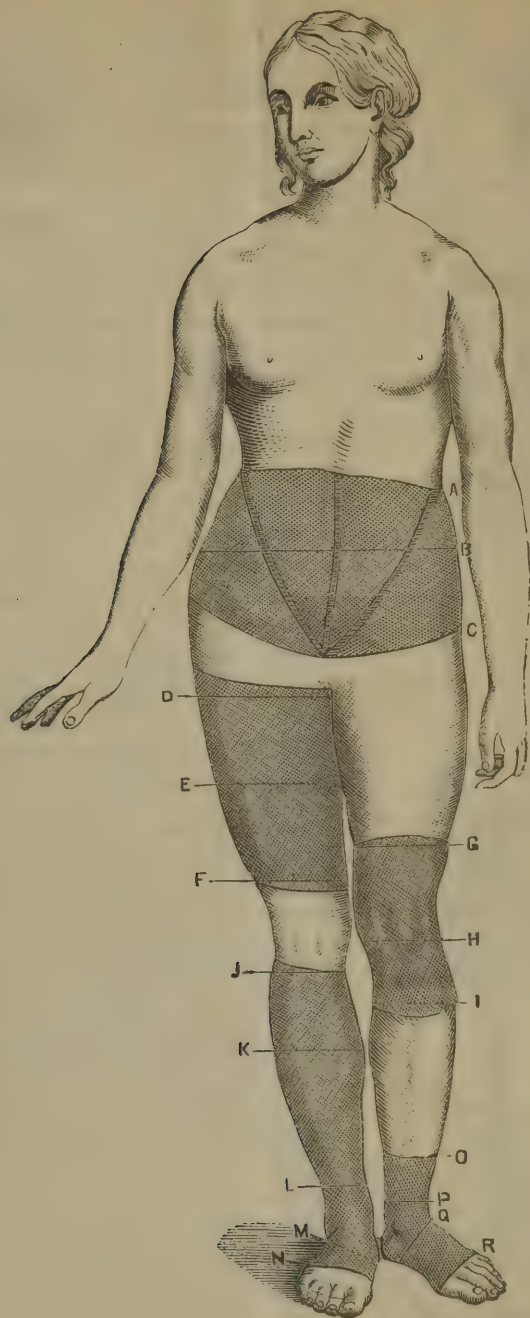
Fig. 63.



One of the most effective instruments for the treatment of wry neck, is that of Bigg, shown applied in fig. 63. It consists of a padded pelvic band, to which is attached a vertebral stem, with horizontal arm pieces at the upper extremity of the stem. A neck lever is fixed to be attached or detached at will. This lever passes around the head, and rests by its outer extremity against the temporal bone on the side towards which the head is deflected. On the opposite side of the head a horizontal lever is fixed, springing from the stem and resting against the lower maxilla. The temporal lever has a vertical axis, moved by a ratchet joint. Upon turning this, the head is gently pressed in a horizontal direction. The lower maxilla lever also acts horizontally, but in a different plane. By the conjoined action of these two levers the contracted sterno-mastoid muscle is extended, the head restored to an erect position, and the chin brought into the mesial line of the body. From the position of the lever, displacement of the head, when the instrument is adjusted, is impossible, and by arrangement of the hair the mechanism may be almost entirely concealed.

The measurements required are, the circumference of the pelvis below the ilium crests, and the circumference under the axilla and around the head. Distance from the pelvic to chest circumference; distance from latter point to centre of the neck; distance from centre of neck to mid-point of lower jaw, and distance between chest circumference and upper and back part of the head.

ELASTIC BELTS, STOCKINGS, &c.



ELASTIC BELTS, STOCKINGS, &c.

DIRECTIONS FOR MEASUREMENT OF ELASTIC BELTS, STOCKINGS, TRUSSES, &c.

FOR SILK, COTTON, AND LACED ANKLE SOCKS.

The circumference at O, P, Q, and R.

State for which ankle.

FOR GARTER STOCKINGS.

The circumference at M, N, L, K, J, and the height from M to J.

FOR KNEE CAPS.

The circumference at G, H, and I.

FOR THIGH PIECES.

The circumference at D, E, and F, and the length from F to D.

FOR ELASTIC AND LACE BELTS.

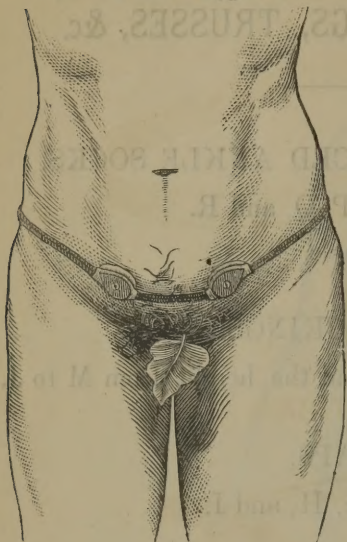
The circumference at A, B, and C, and the depth from the lower part of the abdomen to an inch and a half above the navel.

TRUSSES.

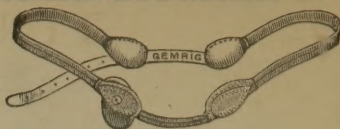
Hood's Truss—Price, \$6.00.



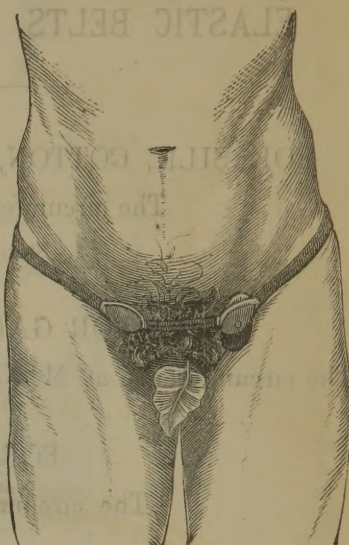
Hood's Truss applied.



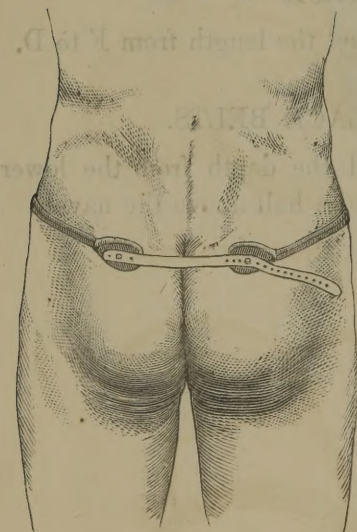
Hood's Femoral Truss—Price, \$6.00.



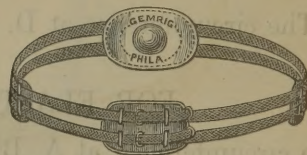
Hood's Femoral Truss applied.



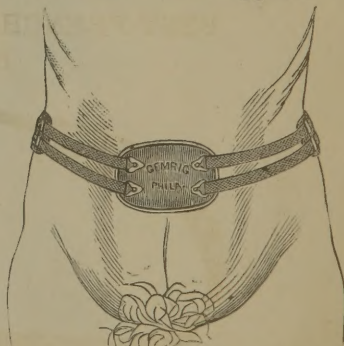
Hood's Truss applied.



Elastic Umbilical Truss—Price, \$5.00



Elastic Umbilical Truss applied.

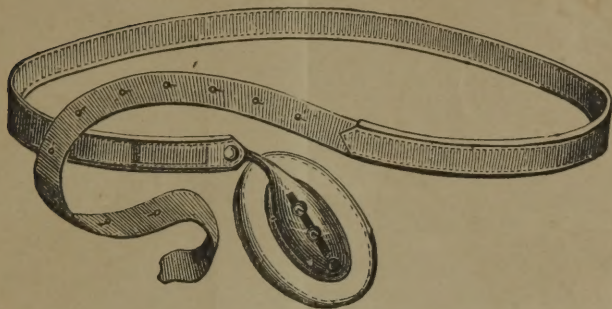


When ordering Trusses, send the measure around the Pelvis, describe the rupture, and state the side the rupture is upon.

TRUSSES

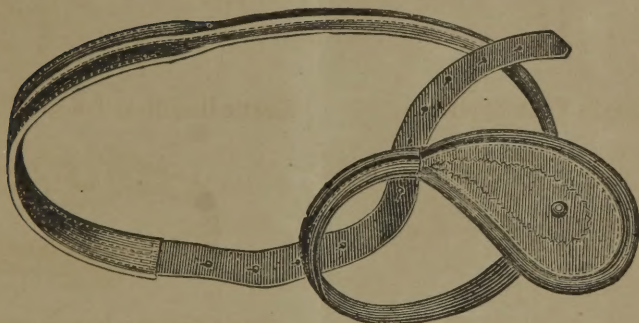
CHASE'S TRUSS, CEDAR PAD.

PRICE, \$3 00.



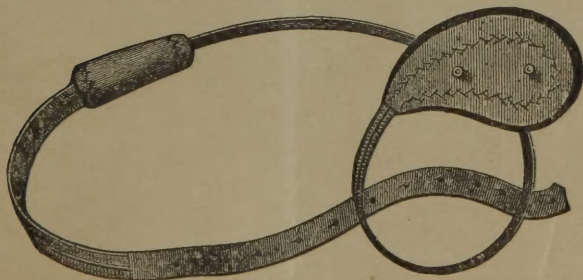
BEST FRENCH TRUSS.

PRICE, \$2.50.



BEST FRENCH TRUSS. (Narrow strap.)

PRICE, \$3.00.



When ordering Trusses, send the measure around the Pelvis, describe the rupture, and state the side the rupture is upon.

